MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2017/2018

EME3066 – CAD/CAM
(ME)

16 OCTOBER 2017
9:00 a.m. – 11:00 a.m.
(2 Hours)

INSTRUCTION TO STUDENT

1. This Question paper consists of 5 pages including cover page with 4 Questions only.

2. Answer **ALL FOUR** questions. All questions carry equal marks and the distribution of the marks for each question is given.

3. Please write all your answers in the Answer Booklet provided.

Question 1

(a) Apply finite element method pre and post processing procedures on a cantilever supported structural member subjected to one directional loading and discuss the outcomes. **[10 marks]**

(b) Illustrate the methods of Boolean operations and their effect on three dimensional model generations. **[5 marks]**

(c) Explain the steps required for the creating the solid model of the simple clamp given in **Fig. Q1**. **[5 marks]**

(d) Draw an assembly tree for the simple clamp shown in **Fig. Q1** and specify the assembly constraint requirements. **[5 marks]**

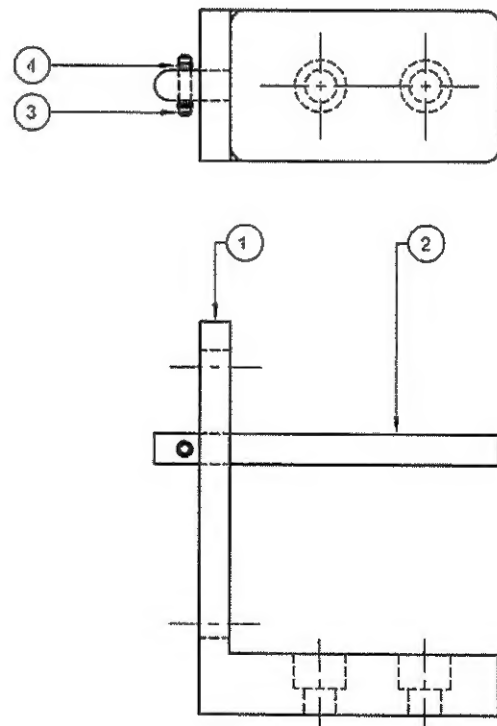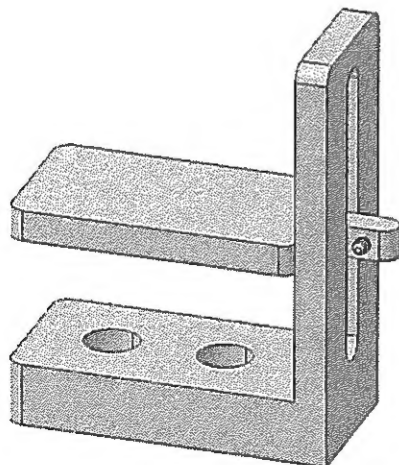| No.	Parts	Material	Quantity
1	Base	Steel	1
2	Weight plate	Steel	1
3	Pin	Hard steel	1
4	Snap ring	Steel	2

Figure Q1 A simple clamp model

Continued ...

Question 2

(a) Differentiate the **THREE** (3) main phases of 'Prototyping' development in terms of their working principle.   **[9 marks]**

(b) State the difference between the schematic diagram of a Selective Laser Sintering (SLS) and Laminated Object Manufacturing (LOM).   **[8 marks]**
(Note: You may use appropriate neat sketches with detail labeling to support your answer)

(c) In your own words, differentiate between 'pre-processing' and 'post-processing' process.   **[8 marks]**

Question 3

(a) One element under the Numerical Control Systems is the 'Positioning System'. By means of a sketch and brief explanation, state the different characteristics available under the 'Positioning System'.   **[9 marks]**

(b) By analyzing your answer in Q3(a), state the preferred 'Positioning System' in the real time CNC industry. Briefly explain your answer.   **[4 marks]**

(c) State the **TWO** (2) different feedback drives available in a rotary encoder. Differentiate them in terms of their working principle.   **[12 marks]**
(Note: You may support your answer with neat sketches and clear labeling)

Question 4

(a) Robot is an automatically controlled material handling unit that is widely used in the manufacturing industry. List out **FIVE** reasons why robot is generally being applied.

[5 marks]

(b) For the component shown **Fig. Q4**, make a part program for machining on a CNC machining center equipped with the ISO controller using absolute programming. Choose the bottom left datum A, as the origin of the part and cut in "clockwise direction". (All dimensions in mm)   **[20 marks]**
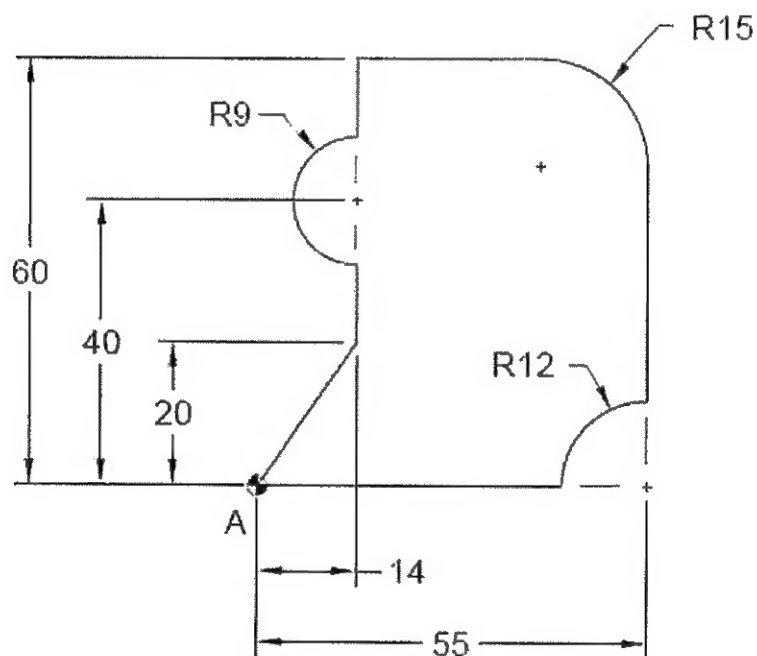

Figure Q4

Appendix : Description of G codes and M codes (*Milling*)

G00 Rapid Traverse or Fast Traverse	M00 Program Stop
G01 Linear Interpolation or Slow Traverse	M02 Program End
G02 Circular Interpolation, CW	M03 Spindle on Clockwise
G03 Circular Interpolation, CCW	M04 Spindle On Counterclockwise
G04 Dwell	M05 Spindle Stop
G17 XY Plane Selection	M06 Tool Change
G18 ZX Plane Selection	M08 Coolant On
G19 YZ Plane Selection	M09 Coolant Off
G20 Imperial Units (Inches)	M10 Work Clamp On
G21 Metric Units	M11 Work Clamp Off
G28 Goto Reference Point	M13 Coolant Spindle Fwd
G40 Cancel Tool Radius Compensation	M14 Coolant Spindle Rev
G41 Left Hand Radius Compensation	M30 Program Stop, Reset To Start
G42 Right Hand Radius Compensation	M98 Subprogram Call
G73 Past Peck Drilling Cycle	M99 Subprogram Exit
G74 Counter Tapping Cycle	
G84 Tapping Cycle	
G85 Boring Cycle	
G90 Absolute Positioning	
G91 Incremental Positioning	
G92 Set Datum	
G94 Per Minute Feed	
G95 Per Revolution Feed	
G98 Initial Level Return	
G99 R Point Return	

End of Paper.